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Bulletin No. 359 - Broiler Production in Utah: An Economic Analysis

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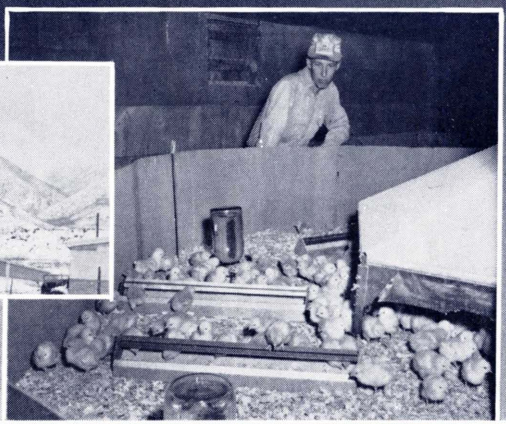
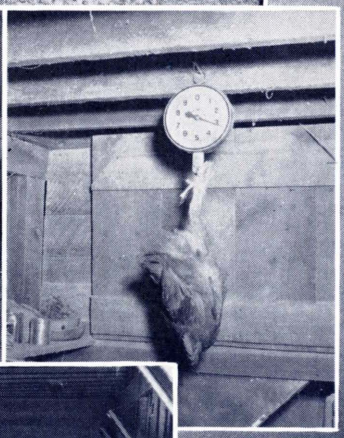
Broiler PRODUCTION IN UTAH

AN ECONOMIC ANALYSIS





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SUMMARY

1. An economic study was made of 128 lots of broilers produced in Utah during 1951 and the first six months of 1952. Records were obtained from 78 producers in eight counties in the state. Approximately 22 percent of the broilers produced in Utah during the above period were included in the study.

2. Only 4 lots were calculated to be a full-time operation for one man. Broiler production was a sideline for producers who generally had non-farm employment or had other farm enterprises that were the major source of employment.

3. All but one of the 78 producers reported that credit was used to finance the enterprise.

4. Production costs averaged 96 cents per bird raised or 30.9 cents per pound of broiler. Feed accounted for 60 percent, chicks 20 percent. labor 11 percent, and miscellaneous costs 9 percent of the total.

5. Receipts per pound of broiler averaged 30.6 cents. Broiler sales represented 98.7 percent of the total receipts. Net returns calculated by subtracting total costs from total receipts averaged a minus $11 per 1,000 birds raised.

6. For their labor, fixed capital, and management, the operator and his family received $323 as an average return per lot of 3266 broilers.

7. The cost of production per pound decreased from 37.4 to 29.2 cents as the size of the lot increased from an average of 1038 to 7143 broilers while net returns per pound increased from a minus 7.0 cents to 1.7 cents.

8. The average mortality was 6.1 percent. High mortality was associated with higher production costs and lower net returns. Pounds of feed required to produce a pound increased from 3.2 to 3.6 pounds as mortality increased from an average of 1.8 to 11.7 percent, and age of bird at sale from 79 to 87 days.

9. An average of 3.4 pounds of feed was required to produce a pound of broiler. As feeding efficiency increased costs per pound decreased and net returns increased.

10. Labor costs represented 11 percent of the total cost of producing broilers. Only 8 percent of the labor was hired. As labor requirements decreased net returns per pound increased and cost decreased.

11. Cost of production decreased as the rate of gain per day increased. A low feed conversion was associated with a poor rate of growth.

12. Composition of a producer's feed was important in broiler production. Some feeds gave better results than others.

13. The third of the producers receiving the highest profit excelled in all measures of success calculated while the least successful third averaged below the total group in all measures calculated.

ACKNOWLEDGMENT

ACKNOWLEDGMENT IS made to staff members of the Department of Agricultural Economics and the members of the Department of Poultry Husbandry who gave suggestions and assistance in organizing, preparing, and reviewing the project and the manuscript for this report; to the various leaders and processors in the poultry industry who gave helpful cooperation; to several student assistants who helped in the field work, and to the producers who cooperated in giving the data that form the basis of this report.

Broiler Production in Utah an economic analysis

BY EARNEST M. MORRISON AND THOMAS I. GUNN[2]

INTRODUCTION

THE PRODUCTION of broilers[3] in Utah has become increasingly important in the last few years. Data are not available prior to 1950 but in that year the gross income from the production of broilers was $629,000. In 1951 almost one and a half million broilers were produced bringing a gross income of $1,322,000 to Utah producers.

With the rapid growth in recent years has come a demand for information about this new industry from producers, prospective producers, processors of meat and feed, agricultural leaders, and agricultural advisers. As with most new industries little specific information has been available concerning the economics of production and no printed information has been available for Utah conditions.

PURPOSE OF STUDY

THE OBJECTIVES of this study have been to determine: (1) the nature and amount of the physical inputs in the production of broilers, (2) the costs and returns of producing broilers in 1951-1952, (3) the relationships of various management and other efficiency factors that relate to the profitableness of producing broilers.

SOURCE OF DATA AND METHOD OF STUDY

THE DATA were collected on an individual lot[4] basis for a twelve month period. Where possible all the lots produced by a grower were included in the study. If necessary records were not available, however, only those lots for which information was available were included. The information included costs and returns from 78 producers for 128 lots of broilers of which 38 were spring, 29 summer, 31 fall, and 30 winter lots. It is estimated that this study covers approximately 22 percent of the broilers produced in the state.

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1. Report on project 356—Purnell.
2. Associate professor and research assistant in agricultural economics, respectively.
3. The Bureau of Agricultural Economics defines a broiler as a young chicken of the heavier breeds marketed from 2 to 5 pounds live weight. This definition applies here.
4. All the chicks started at one time were considered to be a "lot" provided they were handled as a flock. They may have been in more than one pen.

Broiler production in Utah is primarily centered in Cache, Box Elder, Weber, Davis, Salt Lake, Utah, Sanpete, and Sevier Counties. These areas were selected for the sample. By personal interview a survey was taken at the farm and whenever possible the accuracy of each record was checked with other sources such as feed dealers, processors, contractors, and financiers of broiler enterprises in the various areas who had dealings with the grower.

ANALYSIS AND PRESENTATION OF DATA

THIS STUDY includes a description of the enterprises, an analysis of the costs and returns, and factors influencing them, and conclusions.

DESCRIPTION OF THE ENTERPRISES STUDIED

Data were collected from 78 producers of broilers in Utah. Sixty percent of the producers had less than 5 acres of land and had non-farm employment at least part of the year. Some of the off-farm jobs reported were real estate broker, mill or mine worker, barber, truck driver, school teacher, and merchant (table 1). The remaining 40 percent or those who reported no non-farm employment usually had other farm enterprises. Laying flocks, turkeys, dairying, livestock, and general crops

Table 1. *Types of non-farm employment of 78 Utah broiler producers, 1951-1952*

Job	Number
Merchant	4
Teaching or school work	7
Mill or mine	13
Defense plant work	4
Transportation, trucking, etc.	5
Clerks	2
Real estate broker	1
Justice of peace	1
Canning factory worker	4
Carpenter	2
Other	4
TOTAL	47

were carried on with broiler production. There farms averaged 73 acres. Only six producers reported that their major source of income was from the production of broilers.

Broilers were produced under a variety of conditions ranging from small back yard lots, housed in a variety of temporary and renovated quarters, to modernly designed and recently constructed specialized broiler plants. Some were experienced poultry producers and some were relatively inexperienced producers who had turned to broiler production in their efforts to find a means of supplementing their income from industrial employment. Lots ranged in size from 500 to 14,000 chicks and most were of the New Hampshire breed. Only 4 lots were of sufficient size to give one man a full-time job or more while 88 lots were 40 percent or less than full-time. Thirty-six were from 41 to 99 percent of a full-time job (table 2). In over 90 percent of the lots the labor was performed almost exclusively by the operator or his family.

Table 2. *Percent each lot was of full-time broiler operation, Utah 1951-1952*

Percentage	Number
Less than 20	19
21 to 40	69
41 to 60	30
61 to 80	5
81 to 99	1
100 and over	4
TOTAL	128 lots

Each lot was classified to be a full or a percentage of a full-time enterprise on the basis of the total hours available to care for the birds by one man working 10 hours each day under average farm conditions for the time the average lot of birds was on hand. This figure, which would be the necessary time for a full-time broiler enterprise, was divided into the total hours reported by the producer for his lot. The resulting figure represented the percentage each lot was of a full-time operation.

The average investment in fixed capital including land, buildings, and equipment was $5,034. The average investment in operating capital including chicks, feed, labor, and materials was $2,762. Since both fixed and operating capital was used only a portion of the year by a par ticular lot, the fixed capital investment per broiler raised during a year

Table 3. *Fixed and operating capital invested in broiler production, Utah, 1951-1952*

Capital	Total value per lot	Value per bird	Percent of total
	dollars	*dollars*	*percent*
Fixed	5034	.43	73
Operating	2762	.16	27
Total	7796	.59	100

was 43 cents and the operating capital was 16 cents (table 3). Fixed capital amounted to 73 percent of the investment in broilers. Twenty seven percent of the total capital was made up of the feed, chick, labor, and material costs.

All but one of the 78 producers reported that short term credit was used to finance their broiler enterprises. Most of the producers turned to feed dealers and poultry buyers or marketing agencies for this credit. There were a number of different contracts used but three types were most common. They were as follows: (1) the creditor, often called the financier or contractor, allowed enough credit to the producer to furnish the feed, chicks, and some supplies. Interest was charged at the rate of 6 percent for the period the credit was used. (2) The creditor supplied the feed, chicks, fuel, litter, and medicines. The producer furnished the labor, lights, water. The cost of the feed, chicks, and normal brooding expense was subtracted from the gross receipts and this was divided on a 75-25 basis, 75 percent to the grower and 25 percent to the financier. (3) The creditor supplied the feed, chicks, and retained ownership of same. The producer was paid an agreed amount for each bird raised. There was, of course, variations of these three plans, but the contracts described above were the most commonly used.

ANALYSIS OF COST FACTORS

Costs are the market prices per unit times the quantity of the physical inputs needed in broiler production. Production costs averaged 96 cents per bird sold, or 30.9 cents per pound of broiler produced. Costs per pound ranged from 24.5 to 56.6 cents per pound on the 128 lots. These costs included approximately 60 percent for feed, 20 percent for chicks, 11 percent for labor, and 9 percent for miscellaneous costs (table 4).

Feed costs. Feed costs constitute about 60 percent of the total. An average of 10,500 pounds of feed was fed per 1000 birds raised at a cost of $571. Feed costs per pound of bird raised ranged from a low of 14 cents to a high of 32 cents per pound with an average of 18 cents.

Table 4. *Cost of producing broilers, Utah, 1951-1952*

Item	Unit	Per 1000 birds raised			Percent of total cost
		Amount	Price per unit	Total cost	
			dollars	*dollars*	*percent*
Feed	cwt.	105	5.44	571	59.6
Chick	chick	1061	.18	192	20.0
Labor	hours	98	1.05	103	10.7
Housing	dollars	.....	.....	23	2.4
Capital charges:					
Fixed	dollars	1599	.05	21	2.2
Operating	dollars	592	.06	10	1.0
Fuel				17	1.8
Litter				7	.7
Water & lights				5	.5
Taxes				4	.4
Insurance				3	.3
Medicine				2	.2
Misc.				1	.2
Total				959	100.0

Broiler rations varied somewhat among the 128 lots. One-hundred and fifteen lots were raised on an all-mash ration. Some of the mash reported was medicated for disease control. Most mashes were mixed by feed companies and then purchased by the producer. Only one producer reported that he mixed his own mash. A mash and scratch ration was fed to 13 lots. This ration was composed of wheat, corn, and other grains fed with broiler, starting, or growing mash. Occasionally this ration was supplemented with semi-solid buttermilk.

Table 5. *Broiler lots classified on the basis of breed, Utah, 1951-1952*

Breed	No. of lots	Percent of total
New Hampshires	120	93.7
Cornish-Hamps	2	1.6
Rhode Island Reds	1	0.8
Golden Broads	1	0.8
White Rocks	1	0.8
Mixed lots	3	2.3
Total	128	100.0

Table 6. *State of origin of chicks purchased for broiler production, Utah, 1951-1952*

State	No.	Percent of total
Idaho	175,325	41.9
California	84,395	20.2
Washington	82,783	19.8
Utah	43,150	10.3
Oregon	30,375	7.3
Other	2,000	.5
Total	418,028	100.0

Chick costs. The average cost for chicks was 18 cents and represented 20 percent of the total cost of producton (table 4.) Approximately 94 percent of the 128 lots were New Hampshire reds (table 5). About 47 percent of the chicks started came from California, Oregon, or Washington. Idaho hatcheries supplied 42 percent of the chicks in this study but this figure shows some bias since many northern Utah producers were under contract with a creditor with headquarters in Idaho who furnished both chicks and feed (table 6). Only 10 percent of the chicks in this study came from hatcheries located in Utah.

Labor costs. Labor was the third most important item of cost in broiler production amounting to about 11 percent of the total costs (table 4). The average charge for labor per hour was $1.05. This rate represents the value of the producer's labor per hour comparable to what he would have paid to hire the labor or the wage he would receive for similar work. About 301 hours of man-labor were required to raise a lot of 3266 broilers. Operator and family labor represented about 92 percent and hired 8 percent of the total hours required. Daily routine or chores such as feeding, watering, tending stoves, stirring litter, and similar operations accounted for 245.4 hours or about 82 percent of the total labor requirements per lot. Cleaning-up after each lot amounted to 22 hours per flock or approximately 7 percent of the total labor requirements (table 7).

Miscellaneous costs. Interest on operating capital, depreciation and repair of buildings and equipment, interest on fixed capital, taxes, insurance, and material costs are shown as miscellaneous costs. These were 9 percent of the total cost (table 4).

The operating capital comprised that invested in feed, chicks, labor, and material. Interest was calculated on these costs for the average period of time the money was invested in the birds at the rate of

Table 7. *Hours of man-labor required to produce a lot of broilers in Utah, 1951-1952*

Operation	Operator	Operator's family	Hired labor	Total	Percent of total
	hours	*hours*	*hours*	*hours*	*percent*
Procuring chicks feeds and supplies	6.6	.....	.5	7.1	2.4
Preparing brooder and house	9.4	1.3	.8	11.5	3.8
Daily routine care	216.2	21.5	7.7	245.4	81.6
Clean-up after lot	14.7	1.4	5.9	22.0	7.3
Crating and loading	4.3	.8	8.9	14.0	4.7
Miscellaneous	.6	.1	.....	.7	.2
Total	251.8	25.1	23.8	300.7	
Percent	83.7	8.4	7.9	100.0	100

6 percent per annum. Interest on operating capital represented 1.0 percent of the total costs.

Buildings and equipment were valued on the replacement cost basis. An estimate was made of the present cost of replacing the building and this value was depreciated 3 percent per year according to the age of the building to arrive at the present value.

The yearly depreciation on the buildings and equipment was divided by the number of lots raised per year. This figure represented the depreciation for the period the birds were maintained. The cost of repairs was handled in a like manner. Depreciation and repair to buildings and equipment represented 2.4 percent of the total costs.

Fixed capital included the land, buildings, and equipment. The interest charged at the rate of 5 percent per annum was prorated among the number of lots raised per year.

The charge for taxes per lot was calculated by taking the mill rate times the depreciated replacement value base for taxable capital. Total taxes for one year were then divided by the number of lots produced in one year in order to allocate a portion of the taxes to each lot.

Material costs represent only about 4 percent of the total costs in the production of broilers. Such things as fuel, electricity, water, litter, veterinarian services, medicine, insurance, temporary feeders, and miscellaneous items were included as material costs. The cost of fuel represented about half of the material costs. These costs are cut about two thirds during the summer months.

Many different types of heat were used in brooding. Gas was used for 55 percent of the 128 lots. Nine producers used either gas, oil, or coal furnaces for heat while 3 reported that radiant heat was used for brooding purposes (table 8).

Table 8. *Source of heat used in broiler production, Utah, 1951-1952*

Source of heat	Lots	Percent of total
Gas stoves	70	54.7
Electric stoves	17	13.3
Combination, oil, gas, coal	15	11.7
Oil stoves	9	7.0
Furnace—oil, coal, or gas	9	7.0
Coke stoves	5	3.9
Radiant heat	3	2.4
Total	128	100.0

Various types of litter were used in the coops. Straw or wood shavings appeared to be the most common. Several growers often supplemented these litters with shredded sugar cane or peat moss.

Estimating production costs. By use of the average amounts of inputs as developed from this study a method of estimating the total costs per pound of producing broilers under changing levels and relationship of input expenses can be formulated. Ninety-one percent of the costs of producing broilers consisted of feed, chicks, and labor. Therefore, any changes in the prices of these items may give an indication of costs trends in broiler production.

In estimating total production costs multiply 3.4, the average pounds of feed required to produce a pound of broiler, times the average estimated price per pound of feed. Second, multiply .032, the average hours of labor required per pound of broiler, by the average current hourly wage. Third, multiply .34, an adjustment factor to reduce the cost per chick to the cost per pound of broiler, by the current costs per chick. This adjusted figure, .34, is calculated by multiplying 3.1, the average weight of the bird at sale, by 93.9, the average percent raised of the total birds started, and dividing this total into 1 pound. Finally, add the totals resulting from the three operations above, divide by 91 percent and multiply by 100 to adjust for the remaining 9 percent of the costs which were miscellaneous.

The application of this method to the present study is as follows:

Step one: 3.4 x 5.44 cents =18.50 cents or cost of feed per pound of broiler.

Step two: .032 x $1.05 = 3.36 cents or cost of labor per pound of broiler.

Step three: 34 x 18 cents = 6.12 cents or costs of chicks per pound of broiler.

Step four: 27.98 cents per pound = 91 percent of cost items
Step five: Total cost per pound $\frac{27.98 \times 100}{91 \text{ percent}} = 30.75$ cents

If at the beginning a producer could estimate the cost of feed during the production period to be $5.00 per hundredweight, the cost of labor at $1.00 per hour, and could buy chicks for 16 cents each, then he could estimate his total cost of production to be 28.17 cents per pound as follows:

3.4 x $ .05 per pound =	17.00 cents for feed
.032 x $1.00 per hour =	3.20 cents for labor
.34 x $.16 per chick =	5.44 cents for chick
	25.64 cents per pound for 91 percent of cost items.

$\frac{25.64 \text{ cents} \times 100}{91 \text{ percent}} = 28.17$ cents per pound of broiler produced

RECEIPTS AND NET RETURNS

Broilers sales represented 98.7 percent of the total receipts in the production of broilers in Utah. The remaining receipts included the value of the birds eaten at home, the value of the used litter, and refunds (table 9).

Producers generally keep some of their birds for home consumption. About 43 pounds of chicken per lot valued at $13 were retained for home use.

Table 9. *Total receipts and net returns from broilers production in Utah, 1951-1952*

Item	Per lot			Receipts per 1,000 chicks raised	Percent of total receipts
	Amount	Price	Total received		
	pounds	*dollars*	*dollars*	*dollars*	*percent*
Broiler sales	9472	.303	2872	936	98.7
Home use	43	.303	13	4	.5
Value of litter	.....	.....	21	7	.7
Refunds	.....	.....	4	1	.1
Total receipts	.....	.306	2910	948	100.0
Total expenses	.....	.....	2943	959	101.2
Net returns	.....	.....	–33	–11	–1.2

The elemental fertilizer value of the litter was considered to be its total value. On this basis the litter was determined to be worth 70 cents per 100 birds raised.

Receipts per 1000 birds raised were $948. This amounted to $2910 per lot or 30.6 cents per pound of broiler.

Net returns on the 128 lots ranged from minus 19.6 cents to 7.8 cents per pound. These were calculated by deducting the total costs from total receipts and dividing by the pounds of broiler raised. Seventy-three lots had negative net returns and 55 had positive returns. Since the cost of management has not been included in the total costs, net return per pound may be considered to be a return to management. Net returns per lot averaged a minus $33 or minus $11 per $1000 birds raised.

Although net returns were a minus $33 per lot, employment for operator and family labor, and fixed capital, was provided by raising one lot of broilers. Even though labor and fixed capital were costs to the lot, they were also returns to the operator and family to the extent that the operator's own capital was used.

The average return to the operator and his family for labor and management was $258 per lot when the cost of the operator and family labor was added to net returns (table 10.) By adding the return to operator and family labor plus management to the charge for the use of fixed capital, $323 per lot results. This represents what the operator and his family received from the production of a lot of broilers, for their labor, management, and fixed capital to the extent that the operator owned the fixed capital.

Table 10. *Return to operator and family labor, management, and fixed capital from broiler production, Utah, 1951-1952*

Item	Per lot	Per 1000 broilers raised
	dollars	*dollars*
Net return	− 33	− 11
Cost of operator and family labor	291	+ 95
Return to operator and family labor and management	258	84
Charge for use of fixed capital	65	21
Return to fixed capital, operator and family labor and management	323	105

ANALYSIS OF FACTORS INFLUENCING COSTS AND RETURNS

There are many factors that may influence costs and returns. To analyze relationships the tabular analysis method was used. The records were classified into groups according to one factor in an effort to hold the effect of that factor relatively constant. It was then possible to note the variations in other factors as the factor on which the records were sorted varied.

Size of lot. In farm operations the size of the business is thought to be associated with costs and returns. To show the relation of size of the lot to net returns and other factors, a sort was made on the basis of size (table 11).

Five classes were made ranging from those with less than 1500 birds per lot to a class of 5000 or more birds per lot. The over-all range in size was from 500 to 14,000 birds.

As size of the lot increased, costs per pound consistently decreased and net returns increased. Costs decreased from an average of 37.4 to 29.2 cents per pound and net returns per pound increased from a minus 7.0 to 1.7 cents as size of lot increased from an average of 1038 to 7134 birds. As size of lot increased from the smallest to the highest, labor per 100 birds decreased from 24 to 7 hours and fixed capital investment decreased from 68 to 38 cents per bird. Feed efficiency tended to increase as size of lot increased. The group of smallest flocks had an average feed conversion of 3.7 pounds while the group of largest lots averaged 3.3.

Table 11. *Number of chicks started per lot related to costs, net returns, and other factors in broiler production, Utah, 1951-1952*

No. of chicks started			Feed* conversion	Labor per 100 birds raised	Fixed capital inv. per bird	Total costs per lb.	Net returns per. lb.
Range	Average	Lots					
no.	*no.*	*no.*	*lb.*	*hours*	*cents*	*cents*	*cents*
Less than 1500....	1038	19	3.7	24	68	37.4	–7.0
1500 - 2499	1949	41	3.5	12	48	33.2	–2.8
2500 - 3499	2775	26	3.5	10	43	31.4	–0.9
3500 - 4999	3981	17	3.4	10	46	30.6	–0.4
5000 and over ..	7143	25	3.3	7	38	29.2	1.7
All lots	3266	128	3.4	9.8	43	30.9	–0.3

*Pounds of feed fed per pound of broiler raised.

Table 12. *Relationship between season of year broilers were produced and costs, returns, and other factors, Utah, 1951-1952*

Season*	Lots	No. chicks started	Age of bird at sale	Average weight at sale	Percent death loss	Feed conversion	Labor per 100 birds raised	Total costs per lb.	Total receipts per lb.	Net returns per lb.
	no.	*no.*	*days*	*lb.*	*percent*	*lb.*	*hours*	*cents*	*cents*	*cents*
Spring	38	3210	79	3.0	4.8	3.4	10	30.9	31.6	0.7
Summer	29	3254	81	2.9	7.0	3.2	9	29.9	31.4	1.5
Fall	31	3335	87	3.3	6.4	3.5	10	30.6	29.5	−1.1
Winter	30	3277	82	3.1	6.4	3.5	10	32.3	29.8	−2.5
All lots	128	3266	82	3.1	6.1	3.4	9.8	30.9	30.6	−0.3

*Spring: March, April, May
Summer: June, July, August
Fall: September, October, November
Winter: December, January, February

There was no significant association between size of lot and death loss.

Season birds were produced. The season of the year broilers were produced did show some association with costs and returns. The lots were divided into four groups according to the season produced. If the primary production period of a lot was during March, April, or May it was called a spring lot, lots produced primarily during the months of June, July, and August were summer lots, fall lots consisted of those produced during September, October, and November, lots that were grown during December, January, and February were listed as winter lots (table 12).

The small differences noted in costs and returns from producing seasonal lots of broilers was primarily the result of two factors. First, seasonal variation in price caused receipts to be higher during the spring and summer months. Second, broilers were competing seasonally with other meats especially turkey which often necessitated the holding of birds longer causing higher production costs.

In terms of physical factors there was little noticeable difference among the various seasons. Feed conversion and labor requirements were practically the same, size of the lot varied less than 4 percent, the birds were produced at about the same rate of gain per day, and the death loss was little different.

Percent mortality. Death loss was based on the number purchased, and although some extra chicks were given by the hatcheries the percent death loss was over and above any extra chicks that may have been started. Mortality ranged from 0.2 to 31.4 percent.

In order to show the association between death loss and various factors, the records were sorted on the basis of percent mortality. The measure of success or profitableness used was net return per pound (table 13). The data were divided into three groups according to percent mortality, 0 to 3.49 percent in the first group, 3.5 to 6.99 percent in the second group, and 7.0 percent and over in the third group. There were 35 lots in the lowest group with an average of 1.8 percent mortality. The second group had an average of 4.7 percent with 52 lots, and the last group which consisted of 51 lots had an average of 11.7 percent mortality.

Increased mortality was accompanied by higher production costs and lower net returns. As percent mortality increased from the lowest to the highest group, total costs per pound increased from 29.5 to 33.1 cents, feed costs per pound of broiler raised increased from 17 to 19 cents, and net returns per pound decreased from a 0.6 to minus 2.4 cents per pound.

Table 13. *Chick mortality among lots of broilers related to costs and returns and other factors, Utah, 1951-1952*

No. of chicks started Range	Average	Lots	Age of birds at sale	Rate of gain per day	Feed conversion	Feed cost per lb. of bird	Fixed capital inv. per bird	Total costs per lb.	Net returns per lb.
percent	*percent*	*no.*	*days*	*lb.*	*lb.*	*cents*	*cents*	*cents*	*cents*
0 - 3.49	1.8	35	79	.040	3.2	17	44	29.5	0.6
3.5 - 6.99	4.7	52	80	.038	3.4	18	48	30.4	0.3
7.0 and over	11.7	41	87	.036	3.6	19	50	33.1	–2.4
All lots	6.1	128	82	.038	3.4	18	43	30.9	–0.3

Table 14. *Pounds of feed fed per pound of broiler raised related to costs and returns and other factors, Utah, 1951-1952*

Feed conversion Range	Average	Lots	No. of chicks started	Age of bird at sale	Average weight at sale	Percent death loss	Labor per 100 birds raised	Feed cost per lb. of broiler	Total costs per lb.	Net return per lb.
lbs.	*lbs.*	*no.*	*no.*	*days*	*lbs.*	*percent*	*hours*	*cents*	*cents*	*cents*
Less than 3.0	2.8	18	3532	75	3.0	4.3	9	16	27.9	2.9
3.0 - 3.3	3.2	40	4320	78	3.1	5.2	8	17	29.2	1.2
3.4 - 3.7	3.5	34	2674	83	3.1	6.8	12	19	32.4	–1.7
3.8 - 4.1	3.9	25	2794	87	3.3	6.8	11	21	33.5	–2.8
4.2 and over	4.6	11	1900	91	3.0	12.6	15	25	40.0	–9.3
All lots	3.4	128	3266	82	3.1	6.1	9.8	18	30.9	–0.3

Death loss was also associated with other factors. Feeding efficiency or pounds of feed required to produce a pound of broiler increased from 3.2 to 3.6 pounds as mortality increased from an average of 1.8 to 11.7 percent. There was apparently no relationship between mortality and size of lot. A high fixed capital investment per bird was not associated with low mortality which might have been expected since higher fixed capital investment per bird may reflect better equipment and buildings. As percent mortality increased, age of bird at sale increased from 79 to 87 days and rate of gain per day decreased from .040 to .036 pounds.

Feeding efficiency. It is generally expected that efficient use of feed and correct feeding practices reduce costs and may bring higher net returns. To measure feeding efficiency the pounds of feed used to produce a pound of broiler was selected and a sort was made on this basis (table 14). It is recognized that this measure would include differences in quality of the feed, chicks, and the feeder. The records were sorted into five groups on this basis. In the first group of 40 lots feed conversion averaged 2.8 pounds and in the last group of 11 lots it averaged 4.6 pounds. Pounds of feed required to produce a pound of broiler on all lots ranged from 2.6 to 5.8 pounds. As the pounds of feed required to produce a pound of broiler increased from an average of 2.8 to 4.6 pounds, costs per pound increased from 27.9 to 40.0 cents, feed costs per pound of broiler raised increased from 16 to 25 cents, and net returns per pound decreased from 2.9 to minus 9.3 cents. As pounds of feed required to produce a pound of broiler increased percent mortality increased from 4.2 to 12.6 percent, age of birds at sale increased 75 to 91 days, and labor per 100 birds increased from 9 to 15 hours. There was a positive relationship between feeding efficiency and size but this association was more pronounced when the records were sorted on the basis of size.

Table 15. *Relationship of feeding practice in broiler production to costs and returns and other factors, Utah, 1951-1952*

Feeding practice	Lots	Age of bird at sale	Percent death loss	Labor per 100 birds raised	Feed conversion	Total costs per lb.	Net returns per lb.
	no.	*days*	*percent*	*hours*	*lb.*	*cents*	*cents*
Mash and scratch	13	92	8.0	12	3.8	31.3	–0.9
Mash	115	81	5.8	9	3.3	30.9	–0.3
All lots	128	82	6.1	9.8	3.4	30.9	–0.3

Table 16. *Degree of specialization in broiler production related to costs and returns, Utah, 1951-1952*

Degree of specialization Range	Average	Lots	No. of chicks started	Percent death loss	Labor per 100 birds raised	Feed conversion	Total costs per lb.	Net returns per lb.
percent	*percent*	*no.*	*no*	*percent*	*hours*	*lb.*	*cents*	*cents*
25 and less	19	44	2074	5.6	8	3.5	30.9	–0.1
26 - 35	31	28	2506	7.3	11	3.5	32.7	–2.4
36 - 45	41	30	3584	5.1	10	3.3	30.3	0.1
46 and over	68	26	5734	6.5	10	3.3	30.7	–
All lots		128	3266	6.1	9.8	3.4	30.9	–0.3

Table 17. *Man-hours of labor per 100 broilers raised related to costs and returns and other factors, Utah, 1951-1952*

Labor per 100 birds raised Range	Average	Lots	No. of chicks started	Percent death loss	Age of bird at sale	Feed conversion	Fixed capital inv. per bird	Total costs per lb.	Net returns per lb.
hours	*hours*	*no.*	*no.*	*percent*	*days*	*lb.*	*cents*	*cents*	*cents*
Less than 6	5	20	5101	4.0	78	3.2	35	28.2	2.3
6 - 8	7	30	4303	5.7	81	3.4	35	29.5	1.8
9 - 11	10	24	2717	5.3	79	3.3	51	31.6	–1.4
12 - 14	13	19	2395	6.8	82	3.4	52	32.8	–2.4
15 - 17	16	15	2403	7.7	87	3.5	62	34.6	–4.9
18 and over	27	20	2009	11.3	89	3.7	60	36.2	–6.0
All lots	9.8	128	3266	6.1	82	3.4	43	30.9	–0.3

Feeding practice. Ninety percent of the lots studied were raised on a straight broiler mash ration. Ten percent were fed on a mash and scratch ration. To show the effect the type of ration might have on costs and returns, a sort was made on this basis (table 15). The lots were divided into two general groups, lots fed on a straight broiler mash ration in one group and those fed quantities of grain and other feedstuffs along with mash in another.

When a sort was made on feeding practices, the straight broiler mash ration gave the better results. Costs per pound were 31.3 cents and net returns were a minus 0.9 cents per pound when the mash and scratch ration was fed. When straight broiler mash was fed costs per pound were 30.9 cents and net returns per pound were a minus 0.3 cents. The average size of the lots was approximately the same in both groups but lots fed the all mash ration took 3.3 pounds of feed to produce a pound of broiler and had a 5.8 percent mortality rate as compared to 3.8 pounds of feed to produce a pound of broiler and a 8.0 percent mortality rate when the mash and scratch ration was used. The broilers fed on an all mash ration were ready for market at a younger age and thus required fewer hours of labor per 100 birds than those fed the mash and scratch ration. Feeding two kinds of feed may have been more time consuming also although this was not determined.

It is noted further that the lots fed the mash and scratch were below the average in all factors when compared to all lots in the study. The lots receiving an all-mash ration were equal to or above average on all factors. This probably indicates that the scratch, which was no doubt fed in an attempt to reduce feed costs, merely served to throw the total ration out of balance and the results show the effect of feeding an unbalanced ration as against a better balanced one.

Degree of specialization. As noted previously each lot was classified on the basis of its percentage of a full-time operation. To show what effect this consideration may have on costs and returns a sort was made on this basis (table 16).

There was no significant relationships between the percent the lot was of a full-time operation and other factors. Measures of physical input and output were practically the same among the various classes of this sort. It might be expected that the greater the specialization in broiler production the more successful the results. Since the relationship was not shown in the data it must be conceded that it was either covered up by other factors or that the part-time broiler producers were operating about as efficiently as the more specialized producers.

Labor efficiency. Labor costs represented 11 percent of the total costs of producing broilers. Using hours of labor per 100 birds raised as a measure of labor efficiency a sort was made on this basis (table

17). The records were divided into six different classes. The labor per 100 birds ranged from 3 to 57 hours with an average of 9.8 hours.

The group of 20 averaging 5 hours per lot had the lowest cost per pound and had the highest net return. When hours of labor per 100 birds were more than an average of 7, net returns per pound were negative. As labor per 100 birds increased from an average of 10 to 27 hours, net returns per pound decreased from a minus 1.4 to minus 6.0 cents. An inverse relationship existed between hours of labor per 100 birds and size of lot. As the amount of labor per 100 birds increased, the average size of the lot decreased from 5101 to 2009. These relationships suggest that labor is used more efficiently on the larger lots. This same relationship was found when the records were sorted on the basis of size of lot.

It is noted further that when hours of labor per 100 birds increased from the lowest to the highest group, cost per pound increased from 28.2 to 36.2 cents and fixed capital investment per bird increased from 35 to 60 cents. It might be expected that fewer hours of labor per 100 birds would reflect more expensive building and better production equipment. If this was the case an inverse relationship would exist between labor per 100 birds and capital investment per bird. There occurred, however, a positive association which may be explained from the fact that the size of the lots were smaller as labor per 100 birds increased and the total investment was spread over few birds making capital investment per bird increase as hours of labor per 100 birds increased.

Average weight at sale. The records were sorted into five groups on the basis of average weight at sale (table 18). In the first group the average weight was 2.6 pounds and in the last group 3.7 pounds.

Table 18. *Average weight of broiler at sale related to costs and returns and other factors, Utah, 1951-1952*

Average weight at sale			Age of bird	Feed conver-	Feed cost per lb.	Total cost per	Net returns per
Range	Average	Lots	at sale	sion	of broiler	lb.	lb.
lbs.	*lbs.*	*no.*	*days*	*lbs.*	*cents*	*cents*	*cents*
Less than 2.8	2.6	12	81	3.6	20	33.5	−1.8
2.8 - 2.9	2.9	32	78	3.3	18	31.4	−0.2
3.0 - 3.1	3.1	41	78	3.3	18	30.9	−0.4
3.2 - 3.4	3.3	26	85	3.3	18	29.4	1.1
3.5 and over	3.7	17	97	3.7	20	32.2	−2.1
All lots	3.1	128	82	3.4	18	30.9	−0.3

Total costs per pound were lowest and net returns highest when birds were marketed from 2.8 to 3.4 pounds. Birds weighing less than 2.8 pounds and more than 3.5 pounds cost more to produce and gave the smallest net returns per pound, which indicates that birds marketed too small or too large are generally unprofitable.

Lots averaging 2.9, 3.1, and 3.3 pounds at sale required 3.3 pounds of feed to produce a pound of broiler. When the average weight at sale was less than 2.8 pounds, pounds of feed required to produce a pound of broiler averaged 3.6 pounds and when average weight at sale was 3.5 pounds or more, feed required to produce a pound of broiler was 3.7 pounds.

Age at sale. A sort was made on the basis of the number of days the birds were fed in preparation for market (table 19). The age the birds were marketed ranged from 65 to 127 days with an average of 82 days.

When birds were sold in less than 71 days or between 71 and 77 days, costs per pound were 29.4 cents and 29.7 cents, respectively. Birds held longer cost more to produce and had lower net returns per pound. Lower costs and greater returns were probably the result of greater feeding efficiency since 3.1 pounds of feed were required to produce a pound of broiler sold on lots averaging less than 74 days of age.

Age of birds at sale and feed conversion showed the most consistent positive relationship. As the age increased from an average of 69 days for the youngest group to 102 days for the oldest group the feed conversion increased from 3.1 pounds per pound of broiler raised to 3.8 pounds. Labor requirements increased as age increased as would be expected from having the birds on hand for a longer period of time.

Table 19. *Age of broilers at date of sale related to costs and returns and other factors, Utah, 1951-1952*

Age of birds at sale			Average weight at sale	Feed conversion	Labor per 100 birds raised	Total costs per lb.	Net returns per lb.
Range	Average	Lots					
days	*days*	*no.*	*lbs.*	*lbs.*	*hours*	*cents*	*cents*
Less than 71	69	11	3.0	3.1	7	29.4	−0.1
71 - 77	74	39	3.0	3.1	8	29.7	0.7
78 - 84	81	38	3.0	3.4	11	31.5	−0.2
85 - 91	88	22	3.1	3.6	10	32.2	−1.9
92 and over	102	18	3.6	3.8	13	31.7	−1.2
All lots	82	128	3.1	3.4	9.8	30.9	−0.3

Table 20. *Rate of gain per day in broiler production related to costs and returns and other factors, Utah, 1951-1952*

Rate of gain per day			Age of bird	Average weight	Feed conver-	Total costs per	Net returns per
Range	Average	Lots	at sale	at sale	sion	lb.	lb.
lbs.	*lbs.*	*no.*	*days*	*lbs.*	*lbs.*	*cents*	*cents*
Less than .035.....	.032	25	93	3.0	3.8	34.2	–2.9
.035 - .037	.036	24	82	3.0	3.5	31.2	0.4
.038 - .039	.038	29	81	3.1	3.3	30.7	–0.4
.040 - 041	.040	23	80	3.2	3.4	30.0	–0.3
.042 and over	.043	27	74	3.2	3.1	29.2	0.9
All lots	.038	128	82	3.1	3.4	30.9	–0.3

Rate of gain per day. One of the factors affecting costs and returns in the production of broilers was the rate of gain made per day. This was calculated by dividing the average weight of the bird at sale by the age. In order to note the association between rate of daily gain and various factors, the records were sorted into five groups on this basis (table 20). The average increase in weight on all lots was .038 pounds per day. The lowest group of 25 lots gained less than .035 pounds per chick daily, whereas the highest group of 27 lots gained .043 or more pounds per day. The group making the most rapid growth had production costs which averaged 29.2 cents per pound while the group making the slowest rate of gain had costs of 34.2 cents per pound. As rate of gain increased the average age of birds at sale was decreased from 93 to 74 days and pounds of feed required to produce a pound of broiler was decreased from 3.8 to 3.1.

Source of feed. Feeds for the 128 lots came from various sources. Three major sources existed and a fourth group could also be established consisting of miscellaneous sources. Since no two sources produced feeds exactly alike, a sort was made on the basis of feed source (table 21). The records were divided into groups A, B, C, D, each letter representing a different source of feed.

In feed source A the average cost per pound was 33.4 cents and net returns per pound averaged minus 2.4. Feed source A was the only group that showed negative net returns per pound. Group B had the lowest death loss, feed conversion, total costs per pound, and the birds were younger at sale. Feed source C with an average of 2.4 cents had the greatest net return per pound of broiler raised. The birds sold at the

Table 21. *Source of feed for producing broilers related to costs and and returns and other factors, Utah, 1951-1952*

Feed source	No. of chicks started	Average weight at sale	Rate of gain per day	Percent death loss	Feed conversion	Feed cost per lb. of broiler	Total costs per lb.	Net returns per lb.
dealer	*no.*	*lb.*	*lb.*	*percent*	*lb.*	*cents*	*cents*	*cents*
A	2503	3.2	.037	8.0	3.7	20	33.4	–2.4
B	4161	3.0	.041	4.2	3.1	17	29.0	0.8
C	3850	3.1	.037	6.4	3.6	19	29.4	2.4
D	3939	3.3	.039	5.3	3.4	18	30.3	0.1
All	3266	3.1	.038	6.1	3.4	18	30.9	–0.3

heaviest weight were produced from feed source D. The net return per pound for this group was 0.1 cents.

The relationships found by making this sort indicate that compounding of feed is important in broiler production and that some feeds give better results than others. It is apparent that source of feed is closely associated with costs and returns as shown above.

Least profitable, most profitable, and average of all lots. The most profitable producers in any agricultural endeavor are generally those who perform in a manner superior to the average of the group. In this study the third most profitable producers averaged better than the average of the entire group in every measure noted. To show the comparison of the most profitable, average, and least profitable lots, the records were sorted on the basis of net returns per pound (table 22).

The average net return per pound of the least profitable lots was minus 7.2 cents while the most profitable averaged 3.2 cents. Cost per pound on the least profitable was 36.7 cents, 28.1 cents on the most profitable, and the average of all lots was 30.9 cents.

From this sort it is apparent that the most profitable lots were larger in size with 4422 birds started per lot while the least profitable lots started only 2153 birds. It is noted further that average investment per bird on all lots was 43 cents and that the least profitable lots had 62 cents and the most profitable lots 39 cents fixed capital investment per bird.

The feed required to produce a pound of broiler was six-tenths of a pound less in the most profitable lots than in those that were least profitable. Feed costs per pound of broiler raised averaged 17 cents in the most profitable, 21 cents in the least profitable, and the average of all lots was 18 cents. In weight at sale all groups were equal with the birds averag-

Table 22. *Comparison of the third of broiler lots with highest net returns per pound, the third with lowest net returns per pound, and the average of all lots, Utah, 1951-1952*

Item or factor	Unit	1/3 highest net returns per pound	1/3 lowest net returns per pound	Average all farms
Receipts per bird	cents	96	91	95
Cost per bird	cents	86	113	96
Net returns per bird	cents	10	– 22	– 1
Receipts per pound	cents	31.3	29.5	30.6
Cost per pound	cents	28.1	36.7	30.9
Net returns per pound	cents	3.2	–7.2	–0.3
Feed cost per pound of broiler raised	cents	17	21	18
Rate of gain per day	lbs.	.040	.036	.038
Hours of labor per 100 birds raised	hours	7	16	9.8
Average weight at sale	lbs.	3.1	3.1	3.1
Age at sale	days	78	86	82
Percent death loss*	percent	5.0	8.0	6.1
Pound of feed fed to produce a pound of broiler	lbs.	3.2	3.8	3.4
No. of chicks started per lot	no.	4422	2153	3266
Average fixed capital investment per bird	cents	39	62	43

*Calculated on the basis of number of chicks paid for.

ing 3.1 pounds at the time they were marketed. The most profitable lots also excelled in rate of gain per day and age at sale. It is interesting to note that only 7 hours of labor was required per 100 birds on the most profitable lots while it required 16 hours to raise 100 birds on the least profitable lots. Death loss was 1.1 percent below the average of all lots on the most profitable while on the least profitable it was 1.9 percent above the average.

The influence of superior performance in production on financial success can be shown also by classifying the data on the basis of the number of factors on each record that were better-than-average. The factors selected were pounds of feed required to produce a pound of broiler, percent mortality, size of lot, hours of labor per 100 birds, and rate of gain per day (table 23).

When the records were sorted on this basis some consistent relationships were observed. Costs per pound decreased consistently from 38.3 to 27.9 cents, and net returns per pound increased from a minus 7.7 to 2.1 cents as the factors better-than-average increased from none to five. Records with less than three factors better-than-average had negative

Table 23. *Numbers of factors better-than-average in broiler production related to costs and returns, Utah, 1951-1952*

Factors better than average	Lots	No. of chicks started	Rate of gain per day	Percent death loss	Feed conversion	Labor per 100 birds raised	Total costs per lb.	Net returns per lb.
	no.	*no.*	*lb.*	*percent*	*lb.*	*hours*	*cents*	*cents*
None	16	1959	.034	13.8	4.1	16	38.3	−7.7
One	29	2268	.037	9.0	3.6	16	34.7	−4.7
Two	25	2571	.038	6.4	3.6	10	31.8	−0.2
Three	23	3428	.040	5.2	3.3	9	30.7	0.2
Four	24	4812	.040	4.0	3.1	8	28.5	2.0
Five	11	5662	.042	3.7	3.0	5	27.9	2.1
All lots	128	3266	.038	6.1	3.4	9.8	30.9	−0.3

net returns. Lots with four factors above average had a net return per pound of 2.0 cents.

The data presented in this sort suggest that returns to an enterprise increase as more factors became better than average. There would be a difference in returns, however, depending upon which factors were better than average. Since feed costs represented 60 percent of the total costs, it is reasonable to conclude that a lot better than average in one factor such as feeding efficiency might have greater net returns per pound than lots better than average in any other one factor. Also lots better than average in two factors such as feeding conversion, and labor per 100 birds, might show greater net returns than a combination of any other two factors.

Use of this study. A broiler producer in Utah may use the results of this study as a guide for analyzing his enterprise. The group records having been averaged furnished a standard for evaluating both the inputs and returns. It is helpful for a broiler grower to know how his performance compares with the average of similar enterprises. If a producer's average in many measures is low it is reasonable to believe that he should adopt practices used by the more profitable producers. If his performance is above average he should review his practices to see if additional gains could be made above the added cost of more labor, capital, or management.

If a producer has reasonably complete records of his operation and has summarized them for the efficiency measures noted in this study he may normally consider: (1) How do my earnings compare with those of comparable enterprises in the state? (2) In what measure does my business appear to be satisfactory? (3) What changes are needed by way of improving the business? The first two questions can be answered by comparing the records for the individual enterprise with those of the group as presented here. The third question can be answered by a study of the results obtained by successful producers. Some are indicated in the various sorts that have been made here. They will show what is needed but not always why or how. Others could be discovered from individual study and observation of successful enterprises.

As an example of the possible use of the results of this study one of the records taken at random shows the following:

Date chicks were started	January 20, 1952
Breed of chicks	New Hampshires
No. chicks started	2000
No. broilers raised	1792
Percent mortality	10.4
Feed fed per pound of gain	4.2
Feed cost per pound of chicken raised	21 cents

Hours of man-labor per 100 chicks raised	12
Average weight per chick at date of sale	3.0 lbs.
Age when sold	83 days
Fixed capital investment per chick	.76 cents
Rate of gain per day	.036 lbs.
Receipts per chick raised	87 cents
Cost per chick raised	$1.10
Net return above all costs per chick raised	−23 cents
Return to labor, management, and fixed capital per lot	−$138
Average price paid for feed per hundred	$5.05

The producer will know immediately that the enterprise had been unsuccessful as the net return is negative and had he donated his labor, management, and fixed capital he still had a negative return. In a careful analysis of his enterprise he will note his death loss was too high. He will need to examine his methods of handling his flock to find the factors contributing to a high mortality. It may be poor chicks, poor brooding practices, neglect, lack of sanitation, poor ventilation, overcrowding, insufficient feeder or water space.

Further examination shows that the feed conversion was poor, feed costs per pound of chick produced were high, and the rate of gain per day was low. While the chicks were sold at about the most profitable weight the time required to produce that weight was longer than in the more profitable flocks. This will suggest that he look to his feed and feeding practices. Again the chicks and general brooding methods may be at fault. He may be using an inferior feed or an undesirable mixture of feeds in the ration and here he may check the results of others feeding the same feeds. It may be his feeding practices. Overfilled feeders lead to feed waste. Insufficient feeder space probably results in poor growth. Insufficient watering facilities have also been known to limit rate of growth.

The hours of man-labor and capital investment per chick are both high and while some improvement could no doubt be effected, increasing the size of the enterprise may be the best solution of these difficulties.

The price received per pound of broiler was low. This may have been partly a seasonal problem but in this case it was a matter of too many birds graded as seconds and culls which sold for low prices. Here again the production practices need careful review to discover the reasons why poor quality broilers were being produced.

CONCLUSION

FUTURE EXPANSION of the broiler industry in Utah will depend on its profitableness as a farm enterprise. There are a number of factors that influence this. Some contribute more to success than others but no one can be singled out as a sole prerequisite since each interacts upon the others.

The most successful enterprises had larger than average lots and net returns increased as the size of the lot increased. Since the optimum size was not found in this study increasing the number of birds started per lot appears to be a way broiler enterprises may become more profitable in Utah.

Greater feeding efficiency offers a possibility for broiler production to become more profitable. The quality of chicks affects the rate of growth and the efficient conversion of feed to pounds of broiler. Great strides have been made in the breeding of chicks suitable for broiler production and continued effort along this line will be desirable. Management practices and feeding programs influence the operator's chances of marketing his birds with less feed per pound of broiler raised. Poor feed conversion may be caused by defective feeders, over filling feeders, or other poor feeding practices, by producing weak or diseased chicks, or improper housing, and ventilation. Producers may increase their feeding efficiency by following better feeding programs. The compounding of the feed formula and the combining of feed into a ration will affect the results obtained. The present level of all these factors may be improved through continued research and experimentation.

Success in broiler raising is associated with a low death loss. Death losses may be influenced by various brooding and management practices. Therefore the type of heat used, the square feet of floor space per bird, feeder space per bird, the number of chicks per stove, watering facilities, and the type and use of litter, proper ventilation, and sanitation practices, and other management practices may decrease death losses and make an enterprise more profitable.

The more efficient use of labor appears to offer an opportunity to reduce costs and bring greater returns. Labor costs per 100 birds can be cut by increasing the size of the lots since the point was not reached in this study where returns decreased with labor requirements. The installation of labor-saving equipment such as automatic feeders and waterers may also cut costs and increase returns where the increased costs of capital is less than the cost of labor. Convenient arrangement of buildings, pens, and supplies also offers opportunities for increasing labor efficiency.

Costs tended to increase as birds were held to heavier weights. Successive inputs of feed after birds reached a certain age and weight were not proportionate with production of pounds of broilers.

Management practices that will produce early and rapid development of broilers are highly desirable. One of the valuable contributions to success is efficiency in all phases of production. Producers will need to give detailed attention not to just one factor but to all factors of production in growing broilers.

The optimum rates or levels of performance cannot be stated with exactness from the study. Attainable and profitable levels were ascertained and seem to be about as follows: (1) a size of the flock sufficient to challenge the best efforts of the operator and make possible the use of profitable management practices. (2) mortality rates less than 3 percent, (3) feed conversion rates of 3.2 or under, (4) labor requirements not to exceed 70 hours per 1000 broilers, (5) production of a 3.0 pound broiler in 74 days or less, (6) daily gains of .040 pounds or better, (7) fixed capital investments not to exceed 39 cents per chick, and (8) total costs of production not in excess of 90 percent of the selling price.

Broilers produced in Utah are generally consumed in the Intermountain Area. Further expansion of the industry will depend on increased consumptoin of broiler meat in the local consuming areas and the development of market outlets in other areas of the country.

Consumption per capita of broilers in the nation is estimated to be 15 pounds. It is estimated that per capita consumption of chicken including broilers in the Western States is only two thirds to three fourths as high as the United States average. Therefore, increased consumption of broilers through advertising, the availability of broilers on a year-round basis in fresh non-frozen or quick frozen form, and other methods afford opportunities to increase consumption and expand the production of broilers in Utah. This state compares favorably with other states in broiler production (appendix table 1). As noted, from 1944 to 1952 greater efficiency in the production of broilers developed gradually. While the data are not strictly comparable Utah producers seem not to be at any particular disadvantage as compared to producers in other areas. Utah has achieved certain advantages in cost and other factors which may assist the industry in its competition with other areas in the development of the new market outlets. The feasibility of developing out-of-state markets needs further study. The production phase of the broiler industry seems favorable.

Appendix table 1. *Broiler production data from various states*

State	Year study ended	Feed per lb. broiler sold	Death loss	Number started per lot	Age sold	Average weight sold	Labor per 1,000 birds started
		lbs.	*percent*	*no.*	*days*	*lbs.*	*hours*
(1) Maine	1944	4.5	11.5	1,956	102	3.9	.....*
(2) West Virginia	1945	4.4	12.3	1,688	97	3.3	77.4
(3) Delaware	1946	4.7	12.5	13,170	105	3.1	101
(4) Virginia	1947	4.4	10.3	1,935	95	3.2	167.0
(5) Indiana	1947	3.7	10.9	6,100	86	2.89	89
(6) Virginia	1948	4.0	9.5	2,749	88	3.08	97.3
(7) Maryland	1948	4.05	11.32	7,890	93	3.06	.....*
(8) Delaware	1949	3.9	16.1	12,222	95	3.1	73
Utah	1952	3.4	6.1	3,266	82	3.1	98

* Data not available.

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